

WINN & COALES INTERNATIONAL LTD

**Denso
Digest**

**Special Edition Celebrating 40 Years of Global
SeaShield Jetty Pile Protection**



THE QUEEN'S AWARDS
FOR ENTERPRISE:
INTERNATIONAL TRADE
2010



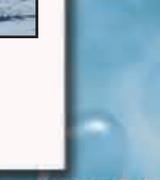
Volume 30 - Number 2

The Statoil South Riding Point Terminal, Grand Bahama Island -See story pages 10-11.

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OVER-125 YEARS SERVICE TO INDUSTRY



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 Fax: +44 (0) 20 8761 2456
 Email: mail@denso.net
 Website: www.denso.net



SEASHIELD INTERNATIONAL

9747 Whithorn Drive, Houston, Texas 77095
 United States of America
 ✓ Marine corrosion protection systems

Tel: +1 281 821 3355
 Fax: +1 281 821 0304
 Email: houston@densona.com
 Web site: www.densona.com



SEASHIELD INTERNATIONAL

411-413 Victoria Street, Brunswick, Victoria 3056,
 Australia
 ✓ Marine corrosion protection systems

Tel: +61 1300 658 590
 Fax: +61 1300 655 064
 Email: denso@densoaustralia.com.au
 Website: www.densoaustralia.com.au



SEASHIELD INTERNATIONAL

PO Box 76167, Manakau City, Auckland,
 New Zealand
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Denso SeaShield - Protecting Structures Against the Sea for over 40 Years

We are pleased to report that from 2011 our Denso SeaShield systems have now been protecting marine structures against corrosion from the ravages of the ocean for over forty years. Effective protection over this period of time would be a considerable achievement on land but in a marine environment it is truly outstanding and a milestone for us, of which we are very proud.

We will demonstrate in the following pages how one original SeaShield system has developed into a sophisticated range of marine protection systems, most of which still contain all of the original winning attributes e.g:

- Surface tolerance
- Ease of application & inspection
- Can be applied under water

It Started in the 1970s

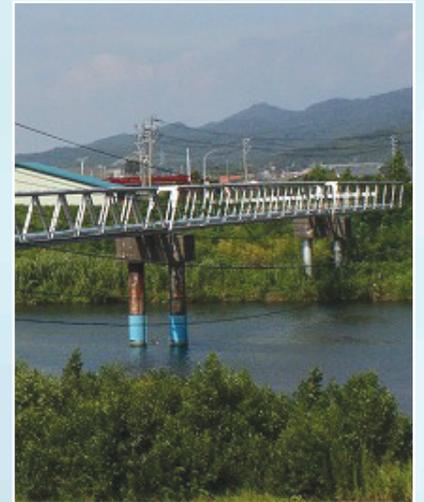
Over forty years ago in the early 1970s, the very first SeaShield systems were installed in Japan (see pictures opposite), Australia and Tasmania.

During the 1980s the system also started to take off in other countries and many more installations were carried out.

The UK was no exception and depicted opposite are the historic Worthing Pier (1984) and the Kyle of Tongue bridge (1989). The inset pictures show recent inspections proving that these applications are still giving excellent protection after many years of service.



Above: 1976, wharf piles protected, Bridgestone LNG Co Ltd, Ishikawa Prefecture, Japan.



Above: 1979, Water pipe bridge piles protected, S-Suido, Japan.



Above: Worthing Pier, Sussex - inset shows heavy marine growth cleaned off of a SeaShield jacket revealing it to be in good condition underneath and perfect working order after 27 years in service.



Above: The Kyle of Tongue Bridge in Scotland - inset shows close up of the excellent condition of the Denso Marine Piling Tape revealed upon jacket removal for inspection, after 22 years service.



SeaShield Inspections

One of the major benefits of the petrolatum based SeaShield Systems is the ease of inspection. Simply remove the jacket and peel back a section of tape to see the condition of the pile beneath it. Replacing the removed tape and jacket afterwards is just as easy.

New SeaShield 'Wood Effect' Piles Protection System used for Dubai Jetty

A jetty pile protection system was required with a finish to match the surrounding existing timber piles in a high profile restaurant location at Dubai Yacht Club.

The customer chose the new SeaShield Series 400 system which has wood grain effect jackets that can be customised to match most wood colours.

The jackets are actually forms that are positioned around the pile on spacers leaving an annulus which is then filled with SeaShield Epoxy Grout.

The jackets remain in position permanently to give extra protection against mechanical damage and once the epoxy grout has set the whole system forms a robust, protective shield around the pile. The SeaShield Series 400 system was applied to a total of 52 timber piles in the project.



The Seashield Epoxy Grout fills the annulus between the pile and the SeaShield Jacket.

The SeaShield Series 400 System being installed on the Dubai Yacht Club Jetty. The inset shows a close up of the wood grain effect on the jackets.



Project Summary	
Product type: Sub Sea / Splash Zone Coating	
Country:	Dubai
Location:	Dubai Yacht Club
Object:	Timber marine piles
Problem:	Corrosion prevention
Product solution:	SeaShield Series 400

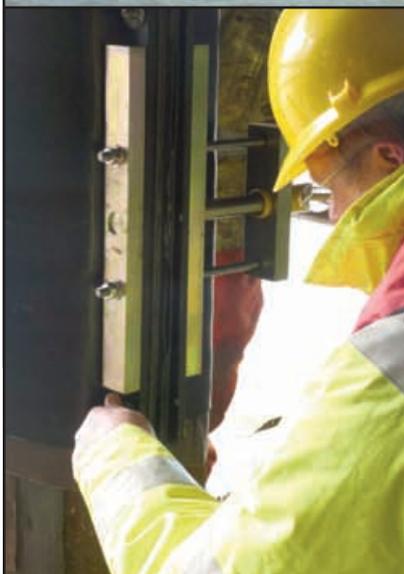
Denso SeaShield Gives Long-term Protection for Trinity House Pier

A major refurbishment project has recently been completed at the Trinity House pier at Harwich in order to facilitate loading of newer and larger vessels now using the pier. The work, which included the addition of new independent fender piles alongside the original pier, was carried out by contractors Bam Nuttall.



The SeaShield jackets are attached around the piles using a hydraulic tensioning tool.

Once the bolts are fully tensioned, the pile protection is complete.



A Denso SeaShield system was again chosen to protect the new independent fender piles as well as the existing piles from the corrosive marine environment. This can be a major problem in splash zones, inter-tidal and subsea environments and the difficult area where the jetty pile meets the jetty platform.

Denso specified SeaShield 2000FD as being the most effective product in the range for this particular project.

It commenced with application of Denso Paste S105, Denso Marine Piling Tape and then the HDPE jackets which were put into position with stainless steel fixings. Denso Marine Piling Tape, a cold-applied petrolatum-based tape for application under water, is the primary anti-corrosion protection in the SeaShield system with a proven 40 year record. The jackets will also give abrasion protection for the Tape system.

Project Summary

Product type:
Sub Sea / Splash Zone Coating

Country: United Kingdom

Location:

Object: Marine jetty piles

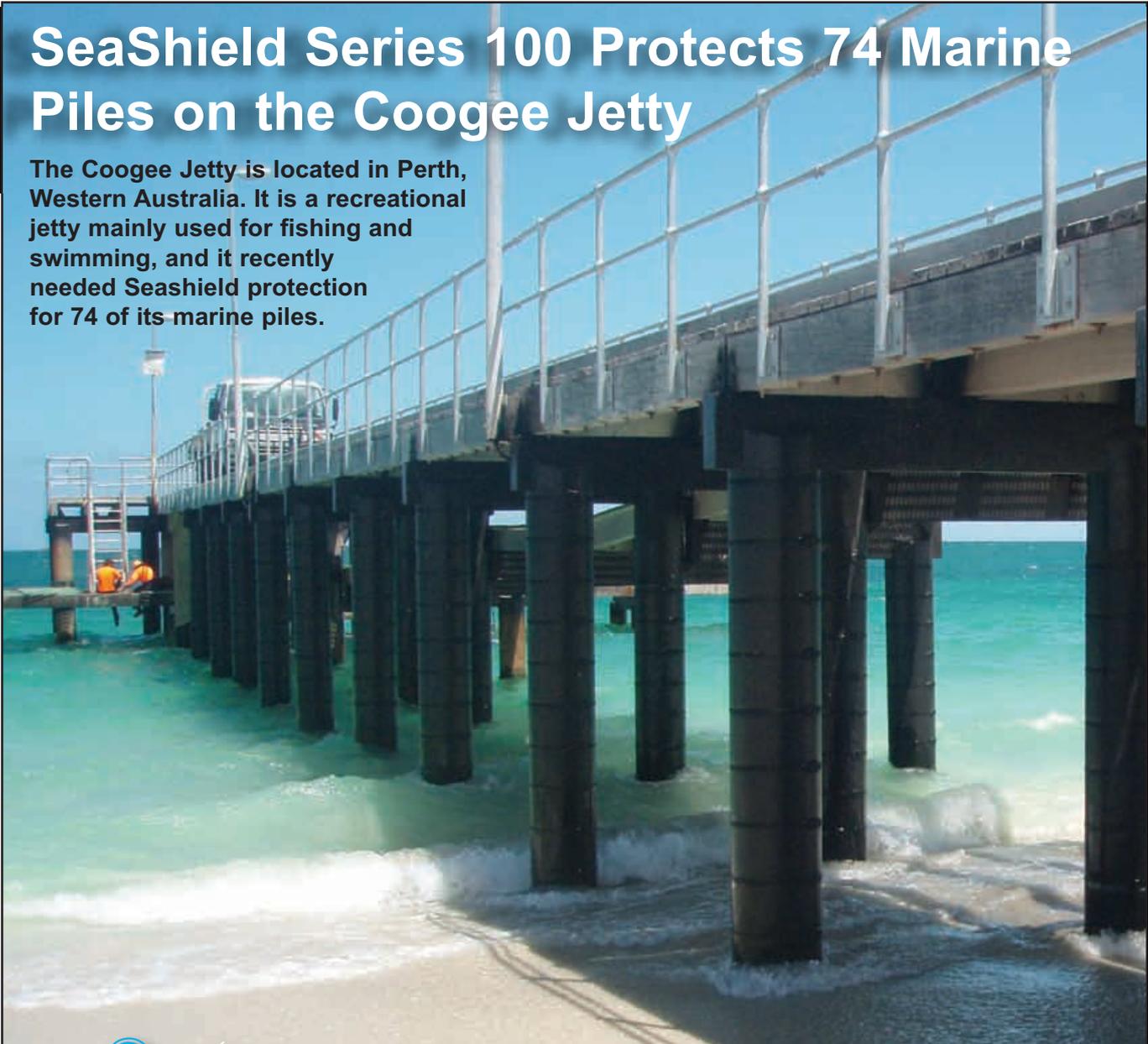
Problem: Corrosion prevention

Product solution: SeaShield Series

2000 FD

SeaShield Series 100 Protects 74 Marine Piles on the Coogee Jetty

The Coogee Jetty is located in Perth, Western Australia. It is a recreational jetty mainly used for fishing and swimming, and it recently needed Seashield protection for 74 of its marine piles.



The SeaShield Series 100 system was chosen to protect all of the 1440mm circumference marine piles leading to 200 lineal meters of protection in total.

An important feature of the Seashield Series 100 system in this particular application was that Smartband low profile banding was used to hold the jackets in place. This meant there are no sharp protrusions sticking out from the system to injure passing swimmers etc.

Project Summary

Product type:
Sub Sea / Splash Zone Coating

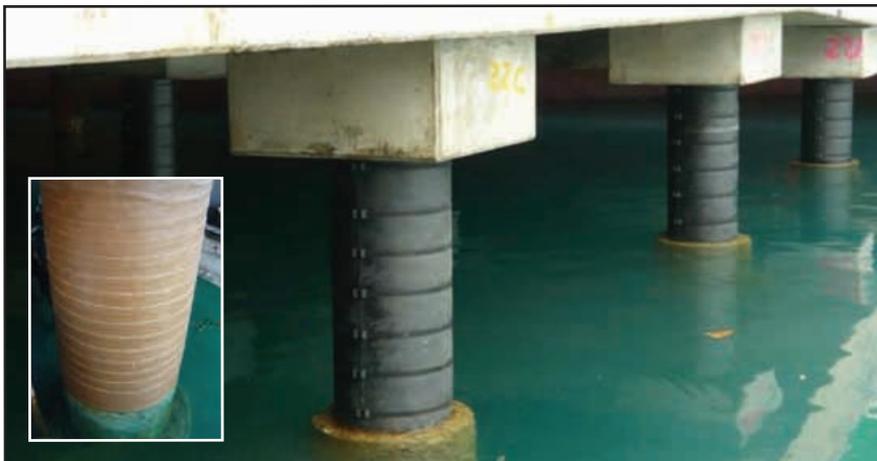
Country: Australia
Location: Perth
Object: Marine jetty piles
Problem: Corrosion prevention
Product solution: SeaShield Series 100

PNG Wharf

40 concrete piles were protected with SeaShield Series 100 on Wharf 14 in Port Moresby, Papua New Guinea.

PNG Wharf 14 is situated in the main harbour at Port Moresby. The piles were water blasted to clean off all loose material before applying the SeaShield system.

The asset owner and Savcor PNG were so pleased with the finished result that they have also approved the SeaShield Series 100 system for use on wharves 12 and 13.



Wharf 14 showing installed Seashield Series 100 system. Inset shows the Denso Marine Piling Tape that forms the heart of the system underneath each jacket.



The BP Refinery Jetty Structure.

BP Refinery Jetty

The BP Refinery Jetty Structure south of Fremantle in Perth required a SeaShield system to protect heavily corroded hexagonal piles.

Seashield 2000 FD was chosen for the job due to its excellent reputation and its ability to easily cope with hexagonal pile profiles.

Gas Platform

The Liquidgas Gas Transmission Platform is in Manukau Harbour on the West Coast North Island of New Zealand.

The structure transmits large quantities of high pressure gas and the SeaShield 250HD system was chosen to provide long-term protection for the 500mm diameter marine piles.



The SeaShield 250HD system installed on the gas transmission platform support piles.

SeaShield Series 500 Marine Railway Protection in Halifax Harbor

Denso Canada has been involved in a very successful SeaShield Series 500 project in Eastern Canada for the Department of National Defense. Located in Halifax Harbor, the project consists of the installation of our Series 500 system on timber piles for a marine railway, used for moving vessels into dry dock and back into the harbor for assignment again.

The SeaShield 500 FRP jackets for the job were manufactured in our Houston, Texas division and shipped to the site while the SeaShield 550 Epoxy Grout component was shipped to the job site from our Toronto division.

The project involved protection of over 120 timber piles with diameters ranging from 11" – 17" and a variety of lengths due to water depth. The job was handled by a team of divers and consisted of pumping the SeaShield 550 Epoxy Grout, using a peristaltic pump on surface, into the annulus between the timber and the SeaShield 500 FRP jacket.

Quite separately from the Series 500 work, there was a large component of petrolatum tape wrapping on rectangular timber headers and cross-bracing that sat above the circular timber piling and under the wharf decking.

The FRP jackets were cut to a variety of lengths on site and two-piece injection ports were installed along with pile stand-offs before being taken below the surface for installation around the piles and subsequent filling.



Above: The marine railway track.

Below: Rectangular timber headers were wrapped with Denso Petrolatum Tape.



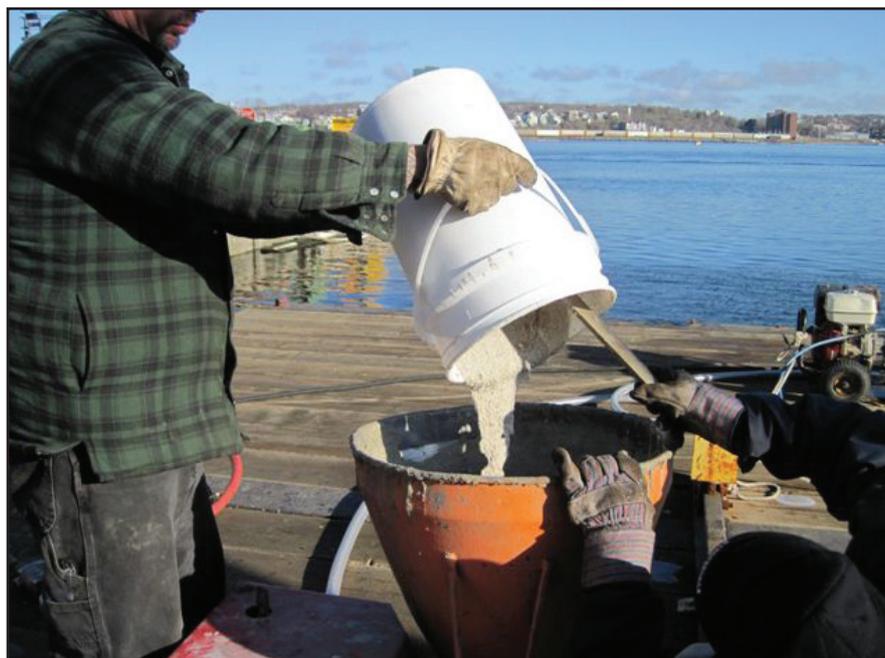
Pumping of the SeaShield 550 Epoxy Grout at cooler temperatures was a concern but the crew managed by keeping all material warm prior to pumping. Making certain the pumping distances were kept to a minimum also contributed to the success of the project in inclement weather.

Denso North America Inc - Canada continues to provide high quality marine protection systems on timber, steel and concrete pilings across Canada and is growing this business with each success.

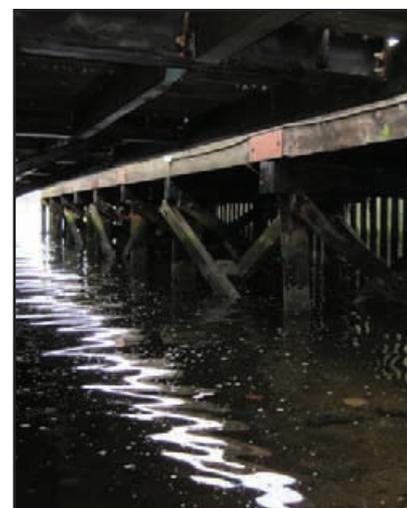
Project Summary	
Product type: Sub Sea / Splash Zone Coating	
Country:	Canada
Location:	Halifax Harbor
Object:	Marine jetty piles
Problem:	Corrosion prevention
Product	SeaShield Series
solution:	500



Above: SeaShield 500 FRP jackets ready for installation.
Below: SeaShield 550 Epoxy Grout being loaded into the peristaltic pump.



Below: View of the piles below the wharf.



Below: Pumping the Epoxy Grout into the jackets was by carried out below water by divers.



SeaShield Series 2000 FD System Provides Ultimate Corrosion Protection for a Crude Oil Terminal in the Bahamas



The Statoil South Riding Point Terminal, Grand Bahama Island.

The system is ideal for environments where conditions are too severe for paint systems, epoxies and other conventional forms of protection.

Statoil recently asked DNV (Det Norske Veritas) to assess the structural integrity of their existing 30-year-old crude oil terminal (Statoil South Riding Point) located on Grand Bahama Island. Diving inspections were performed to allow for close visual inspection that involved thickness measurements as a basis for the assessment. Upon completion of the report, the piles were determined to be structurally sound, however, severe corrosion in the splash zone was found.

Due to its ultimate heavy-duty protection in the most aggressive environments, the SeaShield



Application of SeaShield 2000 FD Outercover to a 78" diameter pile.

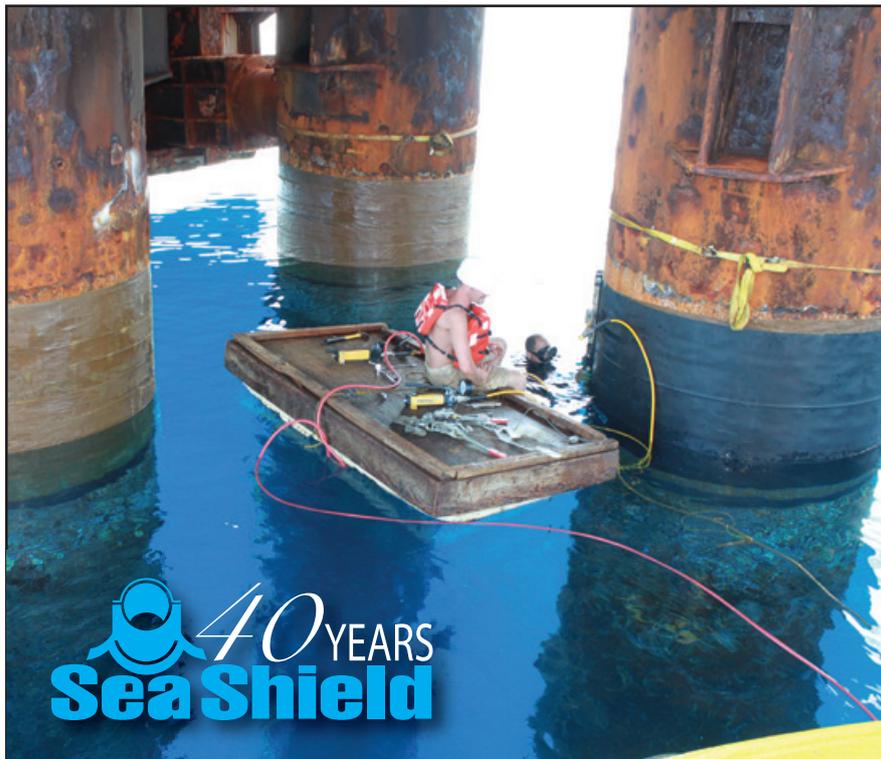
40 YEARS
SeaShield

Denso[®]

40 YEARS
SeaShield

LEADERS IN CORROSION PREVENTION & SEALING TECHNOLOGY

Series 2000 FD System was recommended for corrosion protection of all the piles supporting the structure. The system effectively seals out oxygen and water stopping corrosion on metal surfaces. Statoil then selected Misener Marine Construction out of Tampa, FL to install the system. The large piles ranged from 42" to 98" in diameter. The complete system included SeaShield Marine Tape, which was spirally wrapped with a 55% overlap around the piles, forming an anti-corrosion membrane by displacing water and forming a moisture resistant bond. A tough, UV resistant outercover was then secured over the tape to provide mechanical protection against the elements. A controlled hydraulic tooling system was used to achieve



Securing the SeaShield 2000 FD outercover with the hydraulic tensioning tool



SeaShield Series 2000 FD System fully installed.

the optimal tension for these outercovers.

The first phase of the project was completed in November of 2010 and recently survived Hurricane Irene, which ripped through the Bahamas in late August of 2011. Winds of up to 100 mph were recorded at the location. Due to the excellent work of the contractor and the performance of the system, a second phase was added in the summer of 2011.

Project Summary

Product type:
Sub Sea / Splash Zone Coating

Country: The Bahamas
Location: Grand Bahama Island
Object: Oil terminal piles
Problem: Corrosion prevention
Product solution: SeaShield Series 2000 FD System

40 YEARS
SeaShield

Grand Bahama Island

40 YEARS
SeaShield



Certificate No. FM 01548
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Would you like more information about our long-term corrosion prevention and sealing systems?

If you are interested in any of the products featured in this issue of the Denso Digest please tick box:

Please indicate page number(s):

We also offer tried and tested systems to deal with all the problem areas listed below, simply fax back this completed page and we will supply you with more information.

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